

# International comparisons of capital in health care

Why is the UK falling behind?

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We would like to thank the Office for National Statistics (ONS) for their assistance throughout the analysis.

## Key points

- The UK spends significantly less on health care capital – which includes buildings, machinery, equipment and IT – as a share of GDP than most other comparable countries.
- As a result of low capital spending, from 2000 to 2017 the total value of health care capital in the UK has fallen by 3% in real terms. Over this period, most other countries have seen significant increases in the value of their health care capital driven by higher spending.
- In the UK, the value of capital per health worker – which provides an estimate of the resources available to staff to deliver care to patients – has fallen by 35% since 2000. Many other countries have seen significant and consistent rises in capital per worker over this period. Of the countries analysed, the UK has the second lowest value of health care capital per health care worker (at just over half the average).
- The value of machinery and equipment per health care worker in the UK is the lowest of all countries analysed and continues to fall – countries such as Austria and Denmark have more than five times the value per worker.
- The data raise questions about why the UK is lagging so far behind other countries and concerns about what the implications might be for staff and patients. This reinforces our view that there is a clear need for a long-term capital settlement for the NHS in England – including a substantial funding increase – to address problems such as ageing estates and infrastructure, and to invest in new medical technology in the future.
- Despite government announcements of new funding, we estimate an extra £2.5bn would be required in 2019/20 to bring capital spending in England up to the average of comparable countries.

# Introduction

Capital is a critical component of health care. It includes the buildings, machinery, equipment and IT that allow staff to deliver services. As technology continues to advance, capital investment can help [transform services](#) for patients and improve the productivity of staff.

With the Prime Minister's promises in [August](#) and [September](#) 2019 to provide funding for new hospital buildings and improved facilities, funding for capital in the NHS is now in the spotlight. However, while the new money is much needed following [years of underinvestment](#), the amount pledged [falls well short of the scale of the challenge](#).

For the NHS in England, funding for capital is mostly allocated through the capital budget of the Department of Health and Social Care (DHSC). Following [years of decline](#), since 2016/17 the capital budget for the DHSC in England has increased. The capital budget in England will be [£7.1bn in 2019/20 and 2020/21](#) – over £2bn more than in 2016/17. This includes the funding announced by the government earlier this year

[Our previous analysis](#) found that the UK has had historically low levels of investment in capital compared to similar countries. This has been made worse in recent years by transfers from the capital budget to the revenue budget, which pays for the day-to-day running of the NHS. NHS Improvement has also noted that the capital spending by NHS trusts in England, as a share of revenue spending, is [about half that of comparable countries](#).

Our new analysis has found that between 2000 and 2017, the total value of capital in health care in the UK has fallen by 3%. Over this period, most other countries have seen significant increases in the value of their health care capital, driven by higher spending.

**This long read explores these trends in full. It covers how the amount spent on health care capital has contributed to the total value of health care capital in the UK, as well as how this compares to other countries.**

**It also raises questions about why the UK is lagging far behind other countries and concerns about the possible implications for staff and patients.**

## Notes

### Definitions of health care capital

Due to the availability of data, all the figures are presented at a UK level. At times, we relate this to the DHSC and NHS in England, as we know that the DHSC and NHS in England are by far the biggest contributors to [aggregate health care spending in the UK](#). Additionally, any increases in spending in England will have consequences for the rest of the UK due to the [Barnett Formula for government spending](#).

# 1. What is health care capital and why does it matter?

Without a hospital or GP practice there is nowhere to treat patients, and without the right medical equipment, staff can't provide the best quality care. Of course, the reverse is also true – state-of-the-art equipment is useless without the trained staff to operate it.

The UK currently has the fewest CT and MRI scanners per capita among similar countries<sup>1</sup>, with less than a third of the amount of Germany. These scanners are vital for screening people's symptoms and diagnosing conditions, including cancer, [at an early stage](#).

Shortages in hospital beds are another potential indicator of underinvestment – the UK has [fewer beds per capita](#) than many other Organisation for Economic Co-operation and Development (OECD) countries. However, it's important to note that these examples don't necessarily reflect the overall level of capital in health care across countries. They may also be partly explained by different approaches to care.

## Capital spending

**Health care capital spending is used to finance long-term investment in buildings, equipment, medical technology and IT.**

In the UK, the biggest contributor to capital spending is the DHSC's capital budget, which is used for capital spending throughout the NHS in England. The [recent government announcements](#) of funding to upgrade hospitals or build new ones are examples of capital funding in the NHS.

Our [previous analysis](#) showed that the UK and the NHS lag far behind comparable countries in annual capital spending. While [recent funding announcements](#) will increase the capital budget significantly, they will still leave the NHS lagging behind comparable countries.

[Watch our  
explainer video](#)

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<sup>1</sup> Comparing MRI and CT scanners across countries is difficult. In the UK the data is only on MRI/CT scanners provided by the NHS.

## Capital value

Annual capital spending contributes to a stock of capital. Capital stock is a measure of the value of capital. In health care, **capital stock** is the value of buildings, machinery, equipment, IT and other assets used in delivering services. From capital stock, [health services can be delivered](#). For example, MRI machines will deliver a certain number of MRI scans over their useful life.

Capital stock declines in value over time through depreciation, and as assets age they may also be [retired or scrapped](#). This value after depreciation is known as **net capital stock**, which is the measure of the value of capital we use in this analysis<sup>2</sup>.

Different values of health care capital between countries reflect a combination of things:

- The first is the **amount** of capital. More scanning equipment in one country will give a higher value of capital in that country.
- The second is **age**. As an asset declines in value over time, we expect it to deliver fewer services. An older machine may be able to deliver a similar number of scans this year but cannot be used for as long as a brand-new machine.
- The third is **quality**. For example, we expect newer IT infrastructure to be far more efficient than older infrastructure, and more efficient IT systems to be more expensive than less efficient ones.
- Lastly, there will also be differences in the **price** of assets between countries and changes in market prices over time.

The value of a country's capital stock therefore provides a measurement of the **quantity and quality of health services** that can be delivered. A higher capital stock means we expect to be able to deliver more and/or better quality health care both now and in the future.

[Capital is generally assumed to increase productivity](#) and cross-country comparisons of health care capital may help explain some of the differences in the health care delivery we see across different countries. For more on how this analysis compares values of capital across countries, see note 3 below.

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<sup>2</sup> Gross capital stock refers to the cost of buying the same asset new, rather than in its current condition.

In the following sections we analyse trends in capital spending and the value of capital in health care in the UK compared to other OECD and European countries (see note 4 below). We estimate the total value of capital from 2000 to 2017 using capital stock data from Eurostat. Combined with labour data, we estimate trends in health care capital per worker in each of the countries. Capital per worker is a measure of the value of capital for each worker employed in health care, reflecting the resources available for workers to deliver health services.

## 2. How much does the UK spend on health care capital?

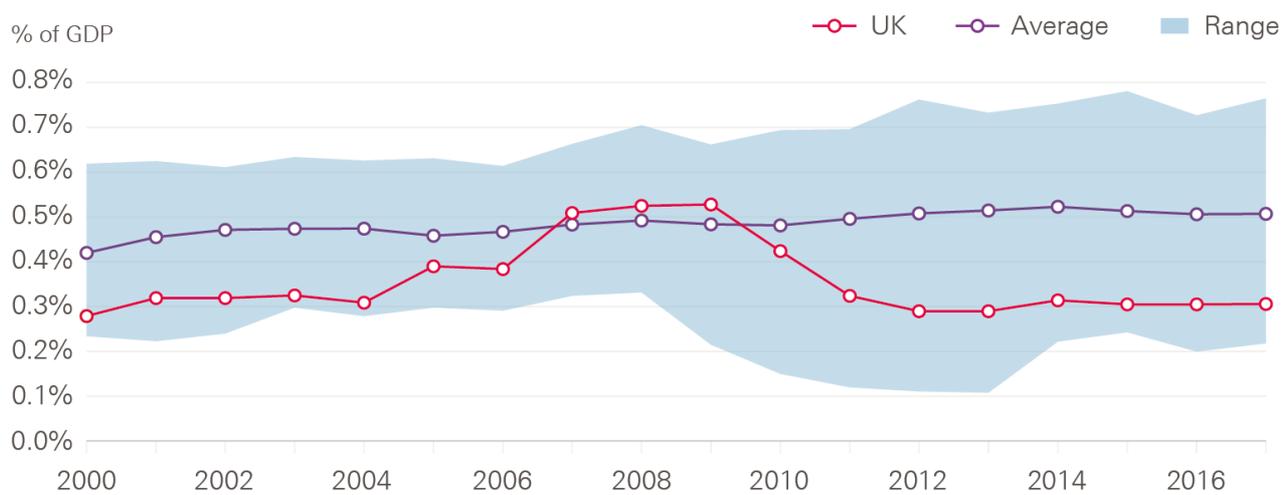
The UK spends significantly less on capital in health care as a share of GDP than comparable countries.

In 2017, the UK spent 0.31% of GDP on capital in health care, compared to 0.51% in similar countries. Aside from the few years between 2007 and 2009, the UK has been consistently below the average since 2000. This is true both of spending as a share of GDP and as a share of total health care spending.

**Figure 1: Fixed capital formation in health care, 2000–2017, OECD countries**

### The UK spends significantly less on capital in health care than comparable countries as a share of GDP

Fixed capital formation in health care, 2000–2017, OECD countries



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Source: Health Foundation analysis of OECD data for countries for which data for all years were available. Countries included: Austria, Canada, Denmark, Finland, France, Greece, Italy, Norway, Sweden, United Kingdom, United States

### How much spending is needed to bring the UK up to the average?

We estimate that bringing the UK up to the average spending on health care capital as a share of GDP would require approximately £11.2bn in total annual spending. In England alone, this figure would be about £9.6bn. This would include all health care capital spending, including that outside the NHS. However, the overall trend is consistent with the capital budget of the DHSC, as it is the largest

contributor to overall capital spending in health care. Closing this gap through the DHSC capital budget would take £2.5bn in additional capital spending this year.<sup>3</sup>

Within overall health care capital spending, the UK also spends less on equipment and machinery, which includes spending on medical technology, as a share of its total capital spending. In 2017, the UK devoted just 36% of its total capital spending towards machinery and equipment, compared to 48% in other countries.<sup>4</sup>

While these data are for the UK as a whole, we expect the NHS in England to be the major driver behind these trends because it is by far the biggest contributor to UK health spending. This is also consistent with our [previous work](#) examining capital spending in NHS trusts in England.

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<sup>3</sup> Not all spending in the DHSC budget will be reflected in this figure, particularly R&D. Additionally, there will be private sector spending in the figure. However, we expect the DHSC to be by far the biggest contributor to this spending. For example, per the ONS, in 2017, 79% of total UK health spending was government expenditure.

<sup>4</sup> These data were estimated from Eurostat data, which relates to a different definition of health to the OECD.

### 3. How have trends in health care capital spending contributed to the value of total health care capital in the UK?

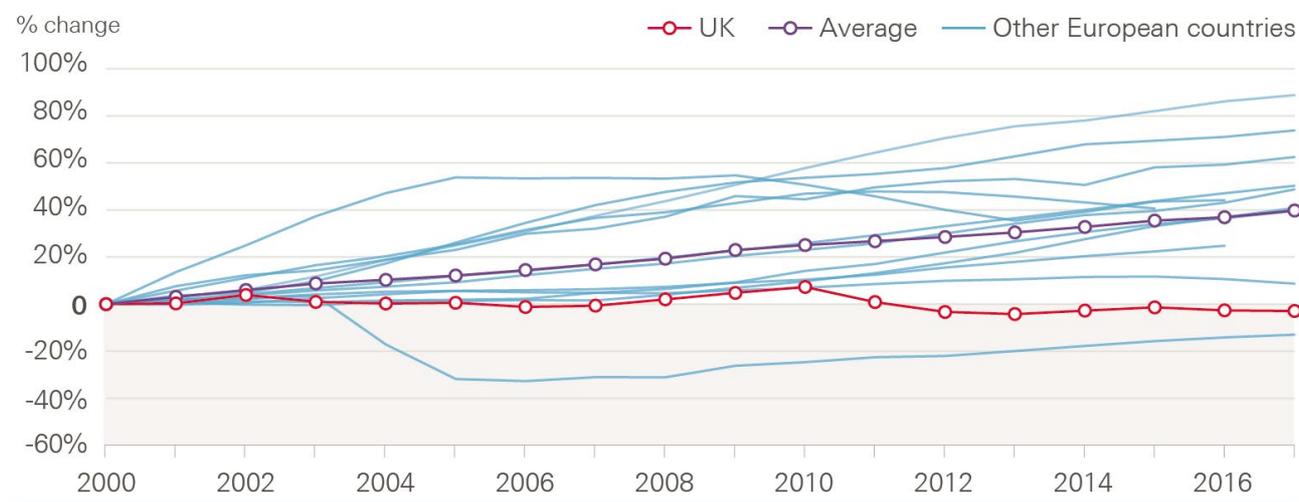
**So how do these trends in health care capital spending contribute to the total value of capital in health care in the UK?**

Figure 2 shows the changes in the value of capital in health care across European countries between 2000 and 2017, revealing a 3% fall in the value of capital in the UK. Over this period in the UK there were three distinct trends. From 2000 to 2006, the value of health care capital was relatively flat, then from 2007 to 2010 it increased by 8%. This coincides with the large increase in capital spending shown in Figure 1. But since 2010, the value of health care capital has fallen by 11% which has coincided with the decline in health care capital spending.

**Figure 2: Change in value of fixed assets in human health activities, 2000–2017 (or nearest year), 2015 prices**

### While the value of health care capital has risen in most other European countries, in the UK it has fallen

Change in value of fixed assets in human health activities, 2000–2017 (or nearest year), 2015 prices



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Source: Eurostat  
Countries included: Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Portugal, Slovak Republic, Sweden, United Kingdom

The analysis suggests that the UK's health care capital spending is mostly focused on replacing existing capital as it deteriorates, while other countries are replacing capital at a faster rate than they are using it, leading to large increases in their health care capital stock.

## Calculating the value of total capital in health care

The data used to calculate capital values in the below relate to the net value of fixed assets in ‘human health activities’ and are obtained from Eurostat. This differs slightly from the definition used in the previous section for capital spending in the health care system from the OECD which includes some services considered to be social care in the UK.<sup>5</sup>

For example, residential care activities are not included in the definition of health care we use to calculate the value of capital. An advantage of this measure is that it offers a closer reflection of the services provided by the NHS. However, this is not necessarily the case for other countries where services such as residential care are considered as health care.

We use Eurostat data for our capital values as the OECD does not provide capital values solely for the health care system, only for ‘health and social work’. As a result, we consider that the Eurostat data provides the best available representation of capital values in health care. As not all countries report the data, we selected all countries with available data, excluding Luxembourg as it is an outlier.

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<sup>5</sup> Under standard industry classifications, the health data we use is industry 86 human health activities. For comparison, we also estimate capital stocks using health and social work industries, which is industries 87 and 88.

## Differences in the value of capital between countries

International comparisons are challenging due to [the way countries measure and deliver health care](#), and particularly social care. The values are based on assumptions which may differ between countries, for example, the length of time they expect capital to be used influences how much it depreciates each year.

There could also be **price differences** in the cost of capital. As the NHS is the single largest health care purchaser in these countries, it could be using its market power to purchase at lower costs. By using within-country indexes from 2000, we can reduce the impact of cross-country differences.

There are also differences in **what is considered health and social care** between countries.

For all the charts we repeated the analysis using the same data sources but with a broader definition which included all health care and social work. The trends for the UK remained similar. While there was an increase in the value of capital, there were still significant falls in capital per worker as a result of an increase in the workforce, and low levels of capital per worker when adjusted for exchange rates.

## 4. How does capital per health care worker in the UK compare to other countries?

The value of health care capital provides an estimate of the resources available to help staff deliver quality services efficiently to patients.

While health care is a service-intensive industry, capital also plays a crucial role in delivering care. A key measure of the capacity of the workforce is the **capital to labour ratio**. This presents an estimate of the resources available to each worker to deliver health services.

Since 2000, the UK has seen a large increase in the number of health care workers. This is consistent with a growing and ageing population leading to increased health care activity. Despite this increase there are [major ongoing issues in the NHS workforce](#) in England, with an estimated 100,000 vacancies in NHS trusts alone as demand for NHS services grows. Similarly, since 2000, most of the other countries analysed also had significant increases in the size of their health workforce.

We can combine the data on capital and the workforce to estimate the value of health care capital per health care worker across these countries.<sup>6</sup> More capital per worker is generally viewed to be a [positive contributor to productivity](#) as staff can work more efficiently with more and newer facilities and equipment at their disposal. It influences the productivity of staff and contributes to both the total quantity and quality of health care that staff can deliver.

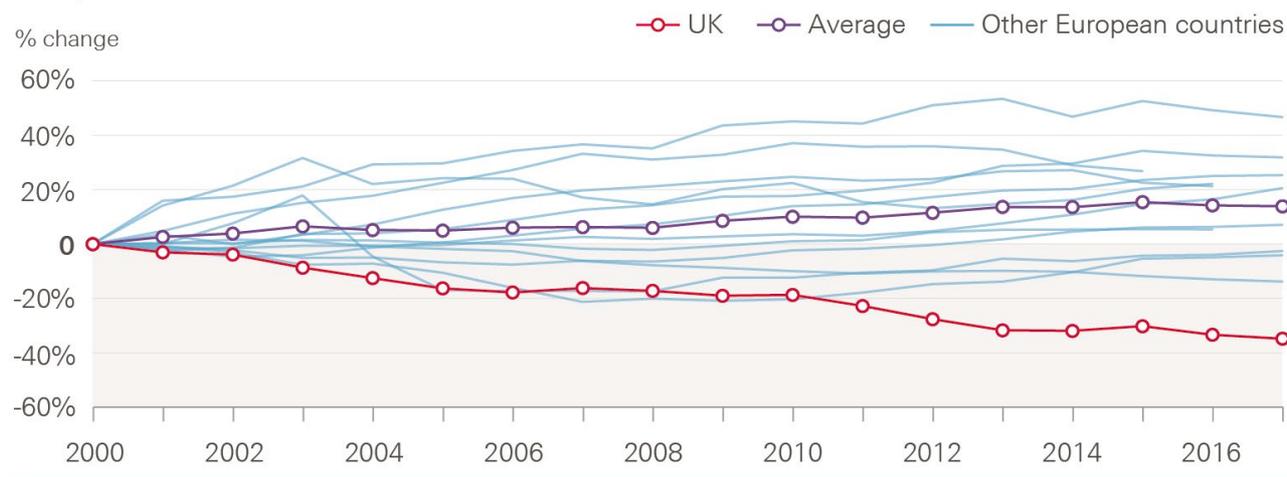
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<sup>6</sup> For comparison to capital values, we use the same industry for health care workers in the previous section. This includes all health care workers in the UK, so will include those not substantively employed by the NHS. It also doesn't reflect the type of health care workers.

**Figure 3: Change in value of fixed assets per FTE worker in human health activities, 2000–2017 (or nearest year), 2015 prices**

## The value of capital per worker in health care in the UK is lagging behind other European countries

Change in value of fixed assets per FTE worker in human health activities, 2000–2017 (or nearest year), 2015 prices



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Source: Health Foundation analysis of Eurostat and OECD data  
Countries included: Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Portugal, Slovak Republic, Sweden, United Kingdom

The falling value of health care capital combined with an increase in health care workers means that capital per worker in the UK has fallen by 35% since 2000, a far greater fall than any other country. Of the countries analysed, most have increasing trends in capital per worker. As noted earlier, the health care workforce data is somewhat crude as it does not differentiate by type of worker. Some of this could be explained by differences in the composition of workforces between countries, for example more doctors and fewer support staff.

There were three periods with different trends in the UK. From 2000 to 2005, the UK had declining health care capital per health care worker, then from 2005 to 2010 the ratio stayed broadly flat. Since 2010 there has been another significant decline in capital per worker which is consistent with the UK's relatively low spending on capital over this period (while the workforce continued to increase).

Using the broader definition of 'health and social work', the trends in capital per worker were similar – a large decline in capital per worker in the UK of 30%. The value of capital in health and social work increased over this period, though at a slower rate than the other countries.

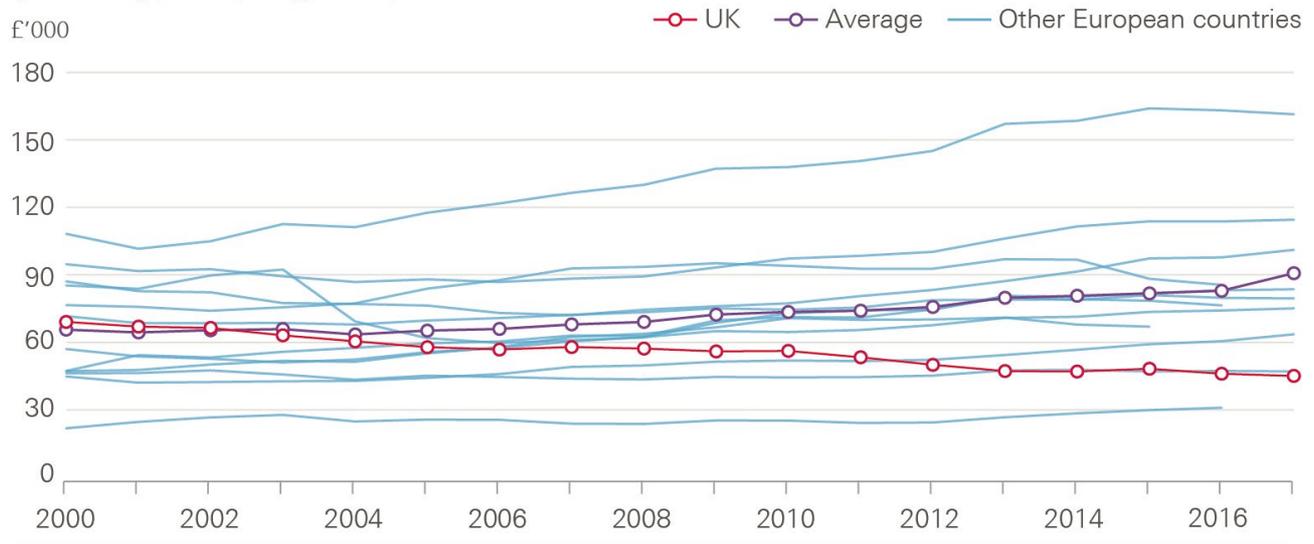
### Value of capital per health care worker

In Figure 4, we examine the same data but in actual values rather than an index.

**Figure 4: Value of fixed assets per FTE worker in human health activities, 2000–2017 (or nearest year), £'000 (purchasing power parity), 2015 prices**

## The UK has a low value of capital per worker in health care

Value of fixed assets per FTE worker in human health activities, 2000–2017 (or nearest year), £'000 (purchasing power parity), 2015 prices



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Source: Health Foundation analysis of Eurostat and OECD data  
Countries included: Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Portugal, Slovak Republic, Sweden, United Kingdom

It shows that in 2000, the UK was about average in terms of the value of health care capital per health care worker. Since then, it has fallen to near the bottom of the ranking (together with France but higher than Greece), to just above half the average value of the countries analysed. It would take a nearly doubling of the value of capital to bring the UK up to the average value of health care capital per worker in these countries and over 50% more to bring capital per worker values back to their 2000 levels.

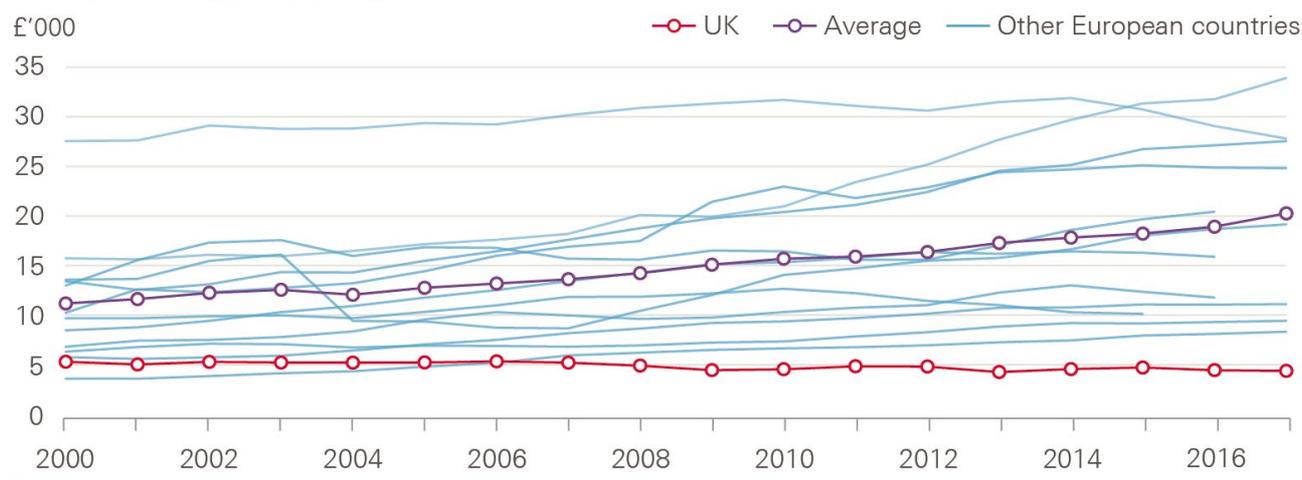
### Machinery and equipment

Figure 5 shows the same ratio as Figure 4, but only using the value of machinery and equipment. The UK has had the lowest value in every year since 2006. Since 2006, other countries with low values are increasing while the UK has a declining trend.

**Figure 5: Value of machinery and equipment per FTE worker in human health activities, 2000–2017 (or nearest year), £'000 (purchasing power parity), 2015 prices**

## The value of machinery and equipment per worker in health care in the UK is lagging far behind other countries

Value of machinery and equipment per FTE worker in human health activities, 2000–2017 (or nearest year), £'000 (purchasing power parity), 2015 prices



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Source: Health Foundation analysis of Eurostat and OECD data  
Countries included: Austria, Belgium, Czech Republic, Denmark, Finland, France, Greece, Italy, Netherlands, Norway, Portugal, Slovak Republic, Sweden, United Kingdom

The data also shows that countries such as Austria and Denmark have more than five times the value of machinery and equipment per worker compared to the UK. However, it does not tell us what type of machinery and equipment it is, nor where it is in the health care system (in primary care or hospitals, for example). This may seem a very large gap, but it is consistent with the international comparisons of specific data we have on medical equipment. For example, Austria and Denmark have more than three to four times the number of CT scanners per capita. There could also be classification differences between countries, where some countries classify certain structures within buildings as machinery and equipment, while others do not.

## Discussion and conclusion

The data highlights some notable trends in the UK. To cope with increasing demand for health care, the UK has been expanding its workforce. The value of health care capital, however, has not increased, leaving each health care worker with significantly less capital to work with than previously. This trend is driven by the UK spending significantly less on health care capital as a share of GDP than other countries.

As we noted earlier, we expect most of this trend to be driven by the capital spending of the DHSC in England. At present, substantial increases in the DHSC's capital budget following announcements of new funding are only for this year and next, and still represent far less than the average annual capital spending of other countries as a share of GDP.

DHSC has outlined a vision for the NHS as a world leader in health technology, yet the UK is spending less on capital than most other countries and a lower proportion of its capital on machinery and equipment. As a result, the value of machinery and equipment per worker in health care in the UK lags far behind other countries – less than a fifth of the value in Austria.

While some of the differences could be driven by measurement differences or price levels between countries, this would not explain the declining values within the UK.<sup>7</sup> Also, data on specific medical technology (such as MRI and CT scanners) shows that the UK has far fewer of these items per capita than most comparable countries, indicating that these trends are not driven by price differences but rather, by the amount of capital.

Increasing capital per worker is not always a good thing – it is the type of capital per worker that matters. Increasing the amount of capital in health care will also require changes in the workforce. For example, becoming a world leader in health care technology requires substantial capital investment, but also investment in the workforce to build the capability to make use of the technology. There are also other costs to consider, such as the cost of preserving capital through maintenance.

While we have noted the limitations in international comparisons of capital in health care, they do provide enough evidence to support further debate about the level of capital and capital spending in the UK compared to other countries. For example, [the age of NHS estates and equipment](#) could explain some of the difference in the value of capital between the UK and other countries – buildings and equipment decline in value as they get older. The UK has a comparatively old health care estate.

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<sup>7</sup> This is true unless prices are falling in the UK on medical equipment and technology while rising everywhere else. We do not expect this to be the case.

This in part reflects the country's long history of health care provision, but also reflects long periods of relatively low investment in new facilities, with the [associated consequences for patient care](#).

## Where next?

Country-level trends do not necessarily suggest that the UK must raise its capital to levels of high-spending countries like Austria and Denmark. Nor do they give us the detail of where capital is lacking or where new funding should be allocated – for example, to primary care or hospitals.

Rather, they highlight the need for us to gain a better understanding of why there are differences between the UK and other countries and what the implications are for health care staff and the care that patients receive. While international comparisons can provide a useful guide to the shortfall in health care capital investment in the UK, spending decisions should be driven by a clear assessment of the needs of local health care systems.

Our previous research highlighted many of the problems with capital and capital funding in the UK. Years of underinvestment in capital have left the NHS in England with many issues, such as a rising maintenance backlog in NHS trusts, a lack of up-to-date medical equipment and scanners, and ageing estates and IT infrastructure.

Leaders in NHS trusts have [highlighted the impact](#) that the capital environment is having on staff productivity and morale, and the very real risks to patient care and safety. Much of this has been the result of underinvestment and a culture of short-termism – for example, the repeated raiding of the capital budget to fund front-line services.

**These comparisons show that the UK is falling behind other countries on capital in health care. While recent funding announcements of additional capital spending for the NHS in England will provide welcome relief to the areas receiving funding, a long-term capital settlement is clearly required to address the wider problems. The capital budget must be considered alongside the revenue budget to ensure that staff have the right mix of resources they need to deliver the best quality care to patients.**

## About the authors

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## Notes

- This long read was published originally at 00.01 on 24 October 2019 at the following address: <https://www.health.org.uk/news-and-comment/blogs/international-comparisons-of-capital-in-health-care-why-is-the-uk-falling-behind>